

Serial No.: 09/457,434 Filed: 12/07/1999
Amendment dated: February 18, 2004
Reply to Office Action of: 2/6/2004
Atty. Docket No.: HEN-9910 (P1998J107)

LISTING OF CLAIMS

Claim 1. (Currently and previously presented) A two stage process for hydroprocessing a hydrotreated distillate feedstock which process consisting essentially of:

- a) reacting said hydrotreated distillate feedstock in a first reaction stage in the presence of a once-through hydrogen-containing treat gas cascaded from the second reaction stage herein, said first reaction stage containing one or more reaction zones operated at hydrodesulfurization conditions wherein each reaction zone contains a bed of hydrotreating catalyst, and wherein said once-through hydrogen-containing treat gas cascaded from the second reaction stage comprises all of the vapor product from the second reaction zone;
- b) passing the resulting reactant to a separation zone wherein a vapor phase stream and a liquid phase stream are produced;
- c) collecting said vapor phase stream overhead; and
- d) introducing fresh hydrogen-containing treat gas into a second reaction stage; and
- e) passing said liquid phase stream to a said second reaction stage in the presence of a said fresh hydrogen-containing treat gas from step (d), said second reaction stage containing one or more reaction zones operated at aromatics saturation conditions wherein each reaction zone contains a bed of aromatics saturation catalyst, and wherein said hydrogen-containing treat gas is passed through said reaction stage countercurrent to the flow of said liquid phase stream.

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Claim 2. (Original.) The process of claim 1 wherein the liquid phase stream, before it passes through said second reaction stage is stripped to reduce its content of dissolved vapor phase product by contacting the liquid with a stripping gas.

Claim 3. (Original.) The process of claim 2 wherein the stripping gas is the vapor phase product from the second reaction stage.

Claim 4. (Previously presented.) The process of claim 3 wherein the stripping gas and liquid phase stream is contacted in a vapor/liquid contacting zone which is vertically disposed above the second reaction zone.

Claim 5. (Previously presented.) The process of claim 4 wherein the vapor/liquid contacting zone is operated in countercurrent flow wherein vapor flows counter to the downward flowing liquid phase stream.

Claim 6. (Original.) The process of claim 1 wherein the vapor phase stream from the first reaction stage is cooled and the resulting condensed liquid stream is separated from the remaining uncondensed stream, and a portion of the condensed liquid stream is combined with the liquid feed to the first reaction stage.

Claim 7. (Previously presented.) The process of claim 2 wherein the vapor phase stream from the first reaction stage is cooled and the resulting condensed liquid stream is separated from the remaining uncondensed stream, and a portion of the condensed liquid stream is combined with the liquid feed to the second reaction stage.

Claim 8. (Previously presented.) The process of claim 4 wherein the vapor phase stream from the first reaction stage is cooled and the resulting condensed liquid stream is separated from the remaining uncondensed stream, and a portion of the condensed liquid stream is used as a quench liquid between two or more of the reaction zones of the first or second reaction stage.

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Claim 9. (Original.) The process of claim 4 wherein the first reaction stage is vertically disposed above the vapor/liquid contacting zone.

Claim 10. (Original.) The process of claim 9 wherein the liquid feedstock flows downward through said one or more reaction zones to said hydrogen-containing treat gas.

Claim 11. (Previously presented.) The process of claim 1 wherein the hydrogen-containing treat gas is cascaded from a vapor/liquid contacting zone of which is vertically disposed above the second reaction zone.